

Trigonometría

Transformaciones trigonométricas

E 4

RELACIONES FUNDAMENTALES

$$\begin{array}{l|l} \sin^2 \alpha + \cos^2 \alpha = 1 & \tan \alpha \cdot \cot \alpha = 1 \\ 1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha} & 1 + \cot^2 \alpha = \frac{1}{\sin^2 \alpha} \end{array}$$

Funciones de sumas y diferencias de ángulos

$$\sin (\alpha \pm \beta) = \sin \alpha \cdot \cos \beta \pm \cos \alpha \cdot \sin \beta$$

$$\cos (\alpha \pm \beta) = \cos \alpha \cdot \cos \beta \mp \sin \alpha \cdot \sin \beta$$

$$\tan (\alpha \pm \beta) = \frac{\tan \alpha \pm \tan \beta}{1 \mp \tan \alpha \cdot \tan \beta}$$

$$\cot (\alpha \pm \beta) = \frac{\cot \alpha \cdot \cot \beta \mp 1}{\cot \beta \pm \cot \alpha}$$

Operaciones con funciones trigonométricas

$$\sin \alpha + \sin \beta = 2 \sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$$

$$\sin \alpha - \sin \beta = 2 \cos \frac{\alpha + \beta}{2} \sin \frac{\alpha - \beta}{2}$$

$$\cos \alpha + \cos \beta = 2 \cos \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2}$$

$$\cos \alpha - \cos \beta = -2 \sin \frac{\alpha + \beta}{2} \sin \frac{\alpha - \beta}{2}$$

$$\tan \alpha \pm \tan \beta = \frac{\sin (\alpha \pm \beta)}{\cos \alpha \cdot \cos \beta}$$

$$\cot \alpha \pm \cot \beta = \frac{\sin (\beta \pm \alpha)}{\sin \alpha \cdot \sin \beta}$$

$$\sin \alpha \cdot \cos \beta = \frac{1}{2} \sin (\alpha + \beta) + \frac{1}{2} \sin (\alpha - \beta)$$

$$\cos \alpha \cdot \cos \beta = \frac{1}{2} \cos (\alpha + \beta) + \frac{1}{2} \cos (\alpha - \beta)$$

$$\sin \alpha \cdot \sin \beta = \frac{1}{2} \cos (\alpha - \beta) - \frac{1}{2} \cos (\alpha + \beta)$$

$$\tan \alpha \cdot \tan \beta = \frac{\tan \alpha + \tan \beta}{\cot \alpha + \cot \beta} = - \frac{\tan \alpha - \tan \beta}{\cot \alpha - \cot \beta}$$

$$\cot \alpha \cdot \cot \beta = \frac{\cot \alpha + \cot \beta}{\tan \alpha + \tan \beta} = - \frac{\cot \alpha - \cot \beta}{\tan \alpha - \tan \beta}$$

$$\cot \alpha \cdot \tan \beta = \frac{\cot \alpha + \tan \beta}{\tan \alpha + \cot \beta} = - \frac{\cot \alpha - \tan \beta}{\tan \alpha - \cot \beta}$$